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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,944	09/19/2002	David William Dew	P.19470/MARJR	3027

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EXAMINER	
WILKINS III, HARRY D	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/069,944	DEW ET AL.	
	Examiner	Art Unit	
	Harry D. Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *36-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *36-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 September 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/7/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status

1. The second preliminary amendment (filed 19 September 2002) introducing claims 36-55 is the last communication received from Applicant with respect to the claims, and as such, this set of claims will be treated on the merits. If Applicant disagrees with this set of claims, a new copy of claims should be submitted in response to this Office Action.

Specification

2. The substitute specification filed 19 September 2002 has been approved and entered.

3. It is also noted that while the originally filed declaration (7 March 2002) was unsigned, the copy of the declaration filed on 19 September 2002 is signed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 36-42, 44-46 and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emmett, Jr et al (US 5,007,620) in view of McWhirter et al (US 6,299,776), Eppstein et al (US 4,680,267) and Whellock et al (GB 2,225,256).

Emmett, Jr et al teach (see abstract) a method of bioleaching a metal from a metal bearing sulfide mineral slurry, including the steps of subjecting the slurry in a

reactor to a bioleaching process at temperatures up to 46°C (see col. 21, lines 10-26), supplying a feed gas containing oxygen (air, see fig. 22, which contains 21% oxygen), and recovering metal from the bioleach residue (see col. 1, lines 38-60).

Thus, Emmett, Jr. et al do not teach (1) the step of controlling the dissolved oxygen concentration in the slurry to a desired level by controlling at least one of the oxygen content of the feed gas, the supply of feed gas or the rate of feed of slurry or (2) the feed gas containing oxygen contains in excess of 21% oxygen.

McWhirter et al teach (see col. 1, line 26 to col. 2, line 19) that the dissolved oxygen concentration in bioleaching (biochemical oxidation) controls the rate at which sulfides were oxidized to sulfates by microorganisms.

Eppstein et al teach (see abstract) control means for adjusting the dissolved oxygen concentration in a bioreactor, which is measured by an oxygen sensor, that controls the oxygen content of the feed gas.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the controlling step of Eppstein et al to the method of Emmett, Jr et al because McWhirter et al teach that dissolved oxygen controls the rate of the reaction and the controlling step of Eppstein et al can control the dissolved oxygen level in a bioreactor to a desired high amount to facilitate the reaction.

Whellock et al teach (see abstract, figures, page 2, lines 14-31 and page 6, line 19 to page 7, line 12) a method for improving oxygen usage in a bioleach process by gasifying a slurry to form a foam. The process includes feeding pure oxygen and is able to function at low concentrations of oxygen (0.5-0.6 mg/L = 0.5-0.6 x 10^{-3}kg/m^3) but still

provides increased oxygen uptake rates due to improved mass transfer of the oxygen gas.

Therefore, it would have been obvious to one of ordinary skill in the art to have modified the method of Emmett, Jr. et al to include the gasifying of Whellock et al for the purpose of feeding pure oxygen at low concentrations to improve oxygen take up rates thereby improving the overall reaction rate as taught by Whellock et al.

Regarding the actual concentration of dissolved oxygen in the slurry, it would have been within the expected skill of a routineer in the art to have optimized the concentration of oxygen in the slurry in order to maximize the reaction rate. Emmett, Jr. et al describe (see figs. 24 and 28) oxygen concentrations ranging from 1 to 4 mg/L (1.0×10^{-3} kg/m^3 to 4.0×10^{-3} kg/m^{-3}).

Regarding claim 37, Whellock et al teach feeding pure oxygen to the bioleach reactor.

Regarding claim 38, Eppstein et al measure (see col. 3, lines 40-47) the dissolved oxygen concentration by directly measuring dissolved oxygen concentration inside the bioreactor.

Regarding claims 39 and 40, Emmett, Jr. et al teach (see col. 21, lines 1-9) controlling the CO_2 content of the slurry. It would have been obvious to one of ordinary skill in the art to have also controlled the amount of carbon dioxide in the slurry by means similar to the oxygen control of Eppstein et al would have been utilized.

Regarding claim 41, Emmett, Jr et al teach (see col. 21, lines 1-9) feeding and controlling CO_2 to the bioleaching reactor. It would have been within the expected skill

of a routineer in the art to have found the optimum amount of carbon dioxide in the feed gas for producing the best bioleaching results.

Regarding claims 42 and 44, Emmett, Jr. et al teach (see col. 21, lines 10-26) performing the bioleaching at up to 46°C using mesophilic microorganisms.

Regarding claims 45 and 46, Emmett, Jr. et al are silent as to the actual bacterium utilized in the process. However, it would have been within the expected skill of a routineer in the art to have selected an appropriate bacterium for performing the operation, such as *Thiobacillus prosperus*.

Regarding claim 53, the reactor of Emmett, Jr et al is substantially closed (see figures 1 and 3, particularly the lid shown in figure 3).

Regarding claim 54, Emmett, Jr. et al teach (see fig. 22) a plant for recovering zinc that includes a reactor vessel (232), a source which feeds the slurry to the vessel, an oxygen source (air compressor) supplying gas to the slurry, and a recovery system to recover zinc from the bioleach residue. Thus, Emmett, Jr. et al fail to teach the device that measures the dissolved oxygen concentration and the control mechanism.

McWhirter et al teach (see col. 1, line 26 to col. 2, line 19) that the dissolved oxygen concentration in bioleaching (biochemical oxidation) controls the rate at which sulfides were oxidized to sulfates by microorganisms.

Eppstein et al teach (see abstract) control means for adjusting the dissolved oxygen concentration in a bioreactor, which is measured by an oxygen sensor, that controls the oxygen content of the feed gas.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the oxygen sensor and control means of Eppstein et al to the plant of Emmett, Jr et al because McWhirter et al teach that dissolved oxygen controls the rate of the reaction and the oxygen sensor and control means of Eppstein et al can control the dissolved oxygen level in a bioreactor to a desired high amount to facilitate the reaction.

It would have been obvious to one of ordinary skill in the art to have fed pure oxygen gas to the reactor as taught by Whellock et al (see above) in order to improve the reaction rate of the bioleaching process.

Regarding claim 55, regarding the limitations that the reactor vessel is operated at temperature in excess of 60°C, the above limitations are not further limiting on the apparatus claim because the above limitation deals with the manner or method of use of the claimed apparatus. It has been well settled that the manner or method of use of an apparatus cannot be relied upon to further limit claims to the apparatus itself. See In re Casey, 152 USPQ 235, and MPEP 2114.

6. Claims 43 and 47-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emmett, Jr et al (US 5,007,620) in view of McWhirter et al (US 6,299,776), Eppstein et al (US 4,680,267) and Whellock et al (GB 2,225,256) as applied to claims 50, 67-69, 71-73, 80 and 81 above, and further in view of Brierley et al (US 5,332,559).

Emmett, Jr. et al teach using mesophilic microorganisms for the bioleach process.

Thus, Emmett, Jr. et al fail to meet the temperature range of 60-85°C or moderate or fully thermophilic microorganisms.

Brierley et al teach (see abstract and col. 21, line 60 to col. 22, line 13) using various different bacterial microorganisms for the decomposition of metal sulfide ores. Brierley et al teach using *Sulfobacillus thermosulfidooxidans* or *Sulfolobus acidocaldarius* species of bacterium.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted the thermophilic or moderate thermophilic microorganisms of Brierley et al for the mesophilic microorganisms of Emmett, Jr. et al because the thermophilic bacteria have the advantage of being more heat resistant to withstand the exothermic bioleach process (see paragraph spanning cols. 22 and 23).

Double Patenting

7. Claims 36-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 50, 67-81 of copending Application No. 10/090,945. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every limitation of the present claims is included in the claims of the '945 Application. Regarding present claim 38, it would have been considered obvious to have determined the dissolved oxygen concentration by directly measuring it so that it could be controlled. Regarding present claim 53, it would have been considered obvious to have performed the bioleaching process in a closed reactor to prevent contamination.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Claims 36-55 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 11-26 of U.S. Patent No. 6,733,567. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every limitation of the present claims is included in the claims of the '567 Patent. Regarding present claim 38, it would have been considered obvious to have determined the dissolved oxygen concentration by directly measuring it so that it could be controlled. Regarding present claim 53, it would have been considered obvious to have performed the bioleaching process in a closed reactor to prevent contamination.

9. Claims 36-55 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 13-28 of U.S. Patent No. 6,833,020. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every limitation of the present claims is included in the claims of the '020 Patent. Regarding present claim 38, it would have been considered obvious to have determined the dissolved oxygen concentration by directly measuring it so that it could be controlled. Regarding present claim 53, it would have been considered obvious to have performed the bioleaching process in a closed reactor to prevent contamination.

10. Claims 36-55 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 11-26 of U.S. Patent No. 6,860,919. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every limitation of the present claims is

included in the claims of the '919 Patent. Regarding present claim 38, it would have been considered obvious to have determined the dissolved oxygen concentration by directly measuring it so that it could be controlled. Regarding present claim 53, it would have been considered obvious to have performed the bioleaching process in a closed reactor to prevent contamination.

11. Claims 36-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 16-44 of copending Application No. 10/444,541. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every limitation of the present claims is included in the claims of the '541 Application. Regarding present claim 38, it would have been considered obvious to have determined the dissolved oxygen concentration by directly measuring it so that it could be controlled. Regarding present claim 53, it would have been considered obvious to have performed the bioleaching process in a closed reactor to prevent contamination.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw